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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/075,602	02/15/2002	Jeffrey Hung	015290-592	1155

7590

06/19/2002

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EXAMINER

UMEZ ERONINI, LYNETTE T

ART UNIT

PAPER NUMBER

1765

DATE MAILED: 06/19/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicati n No.

10/075,602

Applicant(s)

HUNG ET AL

Examiner

Lynette T. Umez-Eronini

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspond nce address --

Peri d f r Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____ .
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 14-18 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☐ Claim(s) ____ is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Pri rity under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____ .
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____ .
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4 . 6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 14 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Subscript "n" is non-enabling for fluorine-containing compounds that have the structural formula, C_nF_{n+4} , when n is 1 or 3.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 17 and 18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 17, "consists essential of" is indefinite for improper use of Markush language. It is suggested that it be rewritten as --consisting essentially of--.

In claim 18, lines 2-3, "... a ratio of flow rates of CHF_3 :argon:chlorine in the formulation is 5 to 80:5 to 80:5 to 60 is indefinite because it is unclear what the ranges represent.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claim 14 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Forget (US 4,214,946).

Forget teaches an etch gas that consist of a mixture of SF₆, Cl₂, in an inert gas (column 6, lines 20-21, and 39-40 and column 7, lines 28-30), which reads on an oxygen-free plasma etching gas formulation comprising one fluorine-containing compound, chlorine, and an optional inert gas.

Claim Rejections – 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 15 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Forget (US '946) as applied to claim 1 above, and further in view of Mitchell et al. (US 5,573,679) and Harshbarger et al. (US 4,208,241).

Forget differs in failing to teach one or more fluorine contain compounds is CHF₃, in claim 15.

Art Unit: 1765

Mitchell teaches sulfur hexafluoride as an effective etchant and also other effective (fluorine containing) etchants include trifluoromethane (column 7, lines 12-14), which suggest either etchant can be used.

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Forget's SF₆ by using CHF₃ as taught by Mitchell for the purpose of obtaining the best-etched semiconductor.

Forget in view of Mitchell differs in failing to specify the ratio of the flow rates of CHF₃:argon:chlorine is 5 to 80:5 to 80:5 to 60, in claim 18.

Harshbarger teaches etch gas composition and inlet flow rate that typically ranges for flow rate is 10-500 sccm are parameters that are subject to control in (plasma) reactors (column 8, lines 17-21). Harshbarger's flow rate which ranges from 10-500 sccm shows that the flow rate of an etch gas composition is variable.

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Abraham by using Harshbarger's method of varying the flow rate of an etchant gas for the purpose of obtaining a specified etch profile (See Harshbarger, column 8, lines 33-35).

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Forget in view of Mitchell by using Harshbarger's method of varying the flow rate of an etchant gas for

Art Unit: 1765

the purpose of obtaining a specified etch profile (See Harshbarger, column 8, lines 33-35).

9. Claim 17 is rejected under 103(a) as being unpatentable over Forget (US '946) as applied to claim 1 above, and further in view of Abraham et al. (WO 97/30472).

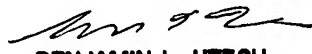
Forget differs in failing to teach etching agents consisting essentially of CHF₃, Ar, and Cl₂.

Abraham teaches the use of Cl₂/Ar/CHF₃ to etch through a TiN ARC layer advantageously results in improved wafer throughput (page 12, lines 4-35). The Cl₂/Ar/CHF₃ is the same as applicant's oxygen-free plasma etching gas formulation that consists essentially CHF₃, Ar, and Cl₂.

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Forget by using Abraham's etchant for the purpose of improving the wafer throughput.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynette T. Umez-Eronini whose telephone number is 703-306-9074. The examiner can normally be reached on Second Friday.

ltue
June 17, 2002


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